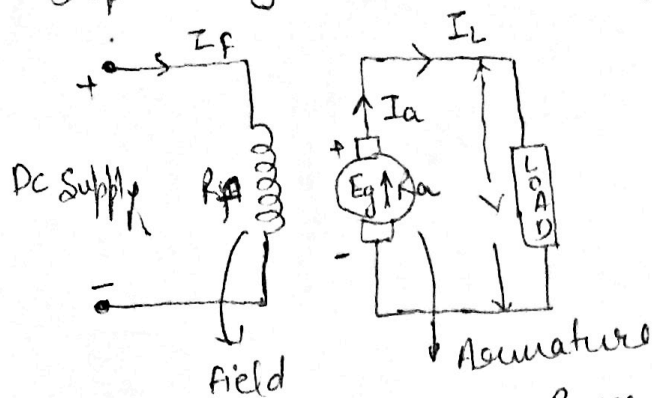


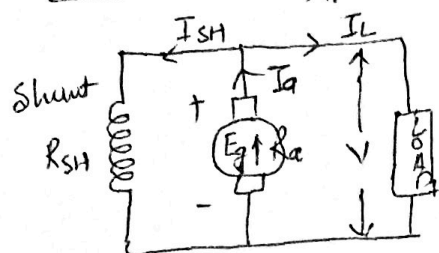
DC generator type

① Separately Excited DC generator —



$I_f \rightarrow$ field current
 $R_f \rightarrow$ field resistance
 $E_g \rightarrow$ generated emf
 $R_a \rightarrow$ Armature resistance
 $I_L \rightarrow$ load current / total current
 $E_g = V + I_a R_a$
 Power developed = $E_g I_a$, Power output = $V I_L$

② Shunt DC generator —

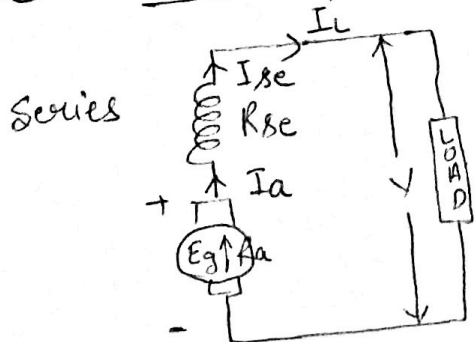


$I_L \rightarrow$ load current / total current
 $R_{sh} \rightarrow$ shunt field resistance
 $I_{sh} \rightarrow$ shunt field current
 $V = I_{sh} R_{sh}$, $I_a = I_L + I_{sh}$

$$E_g = V + I_a R_a$$

Power developed = $E_g I_a$, Power output = $V I_L$

③ Series DC generator —



$R_{se} =$ series resistance

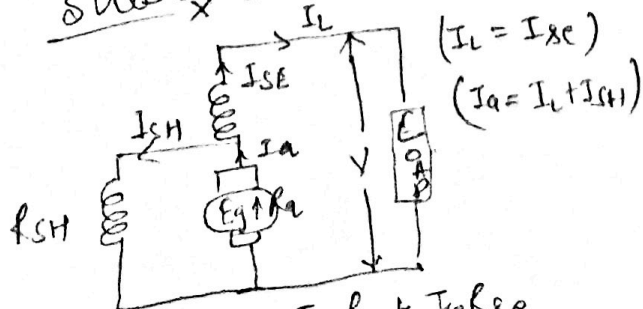
$$I_{se} = I_L = I_a$$

$$E_g = V + I_a (R_a + R_{se})$$

Power developed = $E_g I_a$
 Power output = $V I_L$

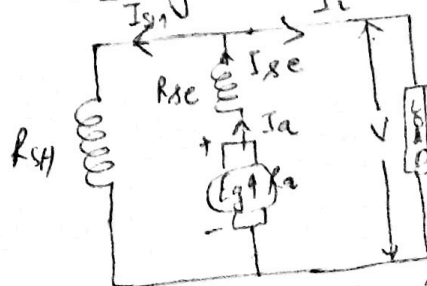
④ Compound DC generator —

short shunt



$E_g = V + I_a R_a + I_{se} R_{se}$
 Power developed = $E_g I_a$
 Power output = $V I_L$

long shunt



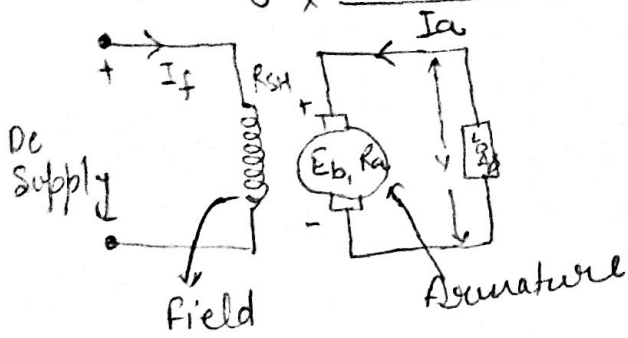
$$(I_a = I_{se})$$

$$I_a = I_L + I_{sh}$$

$E_g = V + I_a (R_a + R_{se})$
 Power developed = $E_g I_a$
 Power output = $V I_L$

DC Motor types -

① Separately Excited DC Motor -



$I_f \rightarrow$ field current

$I_a \rightarrow$ Armature current

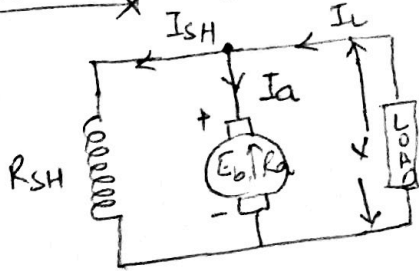
$E_b \rightarrow$ back emf

$R_a \rightarrow$ Armature resistance

$R_{sh} \rightarrow$ field resistance

$$E_b = V - I_a R_a$$

② Shunt DC Motor



$I_L \rightarrow$ load current / total current

$I_a \rightarrow$ Armature current

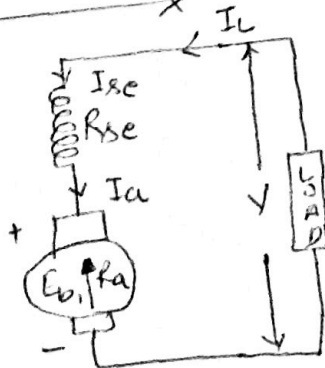
$I_{sh} \rightarrow$ field current (shunt field)

$$I_L = I_a + I_{sh}$$

$$V = I_{sh} R_{sh}$$

$$E_b = V - I_a R_a \text{ --- shunt motor}$$

③ Series DC motor

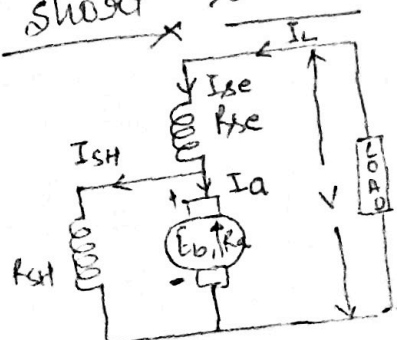


$$I_{se} = I_a = I_L$$

$$E_b = V - I_a (R_a + R_{se})$$

series motor

④ compound motor

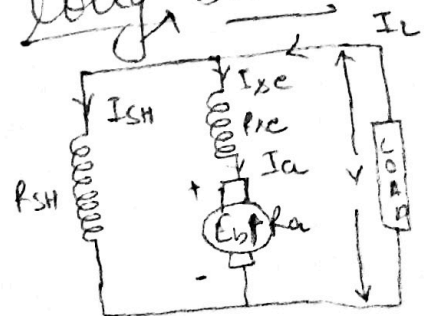


$$I_L = I_a + I_{sh} \quad (I_c = I_{se})$$

$$E_b = V - (I_a R_a + I_{se} R_{se})$$

short shunt compound motor

long shunt



$$I_L = I_a + I_{sh} \quad (I_a = I_{se})$$

$$E_b = V - I_a (R_a + R_{se})$$

long shunt compound motor